Remarks/Arguments

Claims 1, 60, 61, 69 and 73 have been amended. Claims 75-78 have been added. Claims 1-78 are in the application upon entry of this amendment. The specification has been amended. Entry of this amendment, and reexamination and reconsideration of the present application are respectfully requested in the light of the above amendments and the following remarks.

The specification has been amended for the purpose of correcting typographical errors on pages 7 and 9 of the specification. On page 7 at line 29 the term "CO" in Equation (1) has been changed to "CO_2." On page 9 at line 11, the term "Equation (2)" has been changed to "Equation (3)." These changes are being made to correct typographical errors.

Claims 1, 69 and 73 have has been amended to specify "the first reaction zone and the another reaction zone being separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled." Support for these amendments can be found in the Applicant's specification at page 25, line 29 to page 26, line 2; page 26, lines 21-23; page 31, lines 2-4; and page 34, lines 19-21.

Claim 60 has been amended to specify a contact time of about 10 to about 500 milliseconds. Support for this amendment can be found in the Applicant's specification at page 47, lines 12-14.

Claim 61 has been amended to specify a contact time of about 10 to about 500 milliseconds. Support for this amendment can be found in the Applicant's specification at page 53, lines 19-20.

Claims 1-9, 13-55, 57 and 60-73 have been rejected under 35 U.S.C. §102(e) as anticipated by Tonkovich et al. (WO 2004/016346 A1). This rejection is respectfully traversed.

Claim 1 has been amended to specify "the first reaction zone and the another reaction zone being separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled." This is not shown in Tonkovich et al. Claims 2-9, 13-55, 57 and 60-68 depend from claim 1 and are distinguishable from the teachings in Tonkovich et al. for at least the same reasons as claim 1.

Claims 69 and 73 have been amended in the same manner as claim 1 and are therefore distinguishable from the teachings in Tonkovich et al. for at least the same reasons as claim 1. Claims 70-72 depend from claim 69 and are distinguishable from the teachings in Tonkovich et al. for at least the same reasons as claim 69.

Withdrawal of the rejection of claims 1-9, 13-55, 57 and 60-73 as anticipated by Tonkovich et al. is believed to be warranted and is respectfully requested.

Claims 1-74 have been rejected under 35 U.S.C. §103(a) as unpatentable over TeGrotenhuis et al. (WO 03/078052 A1) in view of Van Egmond (U.S. 2004/0127759 A1), O'Rear et al. (U.S. 6,703,429 B2) and Brophy et al. (U.S. 7,294,734 B2). (Note that the lead inventor identified in TeGrotenhuis et al. is Ward E. TeGrotenhuis; the Examiner referred to the reference as being "Ward et al." while the Applicants will refer to it as being "TeGrotenhuis et al."). This rejection is respectfully traversed.

TeGrotenhuis et al. discloses a microchannel device and a method of use wherein a reaction microchamber is in thermal contact with a heat exchange channel. An equilibrium limited exothermic chemical process is conducted in the reaction microchamber. Sufficient heat is transferred to the heat exchange channel to lower the temperature in the reaction microchamber down its length to substantially increase at least one performance parameter of the exothermic chemical process relative to isothermal operation. However, the reference does not disclose a process wherein a first reaction is conducted in a first reaction zone in a microchannel reactor to form an intermediate product composition, another reaction is conducted in another reaction zone in the microchannel reactor to form a final product, and the first reaction zone and the second reaction zone are separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled. This is specified in the Applicants' amended claims 1, 69 and 73 and is not suggested by the teachings in TeGrotenhuis et al. As such, the requirements of claims 1, 69 and 73 are clearly distinguishable from the teachings in TeGrotenhuis et al. Claims 2-68 depend from claim 1 and are distinguishable from the teachings in TeGrotenhuis et al. for at least the same reasons as claim 1. Claims 70-72 depend from claim 69 and are distinguishable from the teachings in TeGrotenhuis et al. for at least the same reasons as claim 69.

Claim 74 is directed to a process for conducting a dimethyl ether synthesis reaction wherein in a first reaction zone in a microchannel reactor the approach to equilibrium for the conversion of CO is from about 75% to about 95%, and the approach to the equilibrium for the conversion of CO in another reaction zone is from about 75% to about 95%. This is not disclosed in TeGrotenhuis et al.

The Examiner cited O'Rear et al. for its disclosure of a process wherein "a process for methanol synthesis wherein an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone." The teachings in O'Rear et al. are clearly distinguishable from the requirements of the Applicants' claims 1-74. O'Rear et al. disclose a dual functional syngas conversion wherein syngas is converted to high molecular weight products via a methanol intermediate. Two different types of catalysts are used. A methanol intermediate is formed with the first catalyst. The methanol intermediate is then rapidly consumed over the second catalyst during the formation of the final products which are higher molecular weight products. O'Rear et al. does not suggest, as specified in the Applicants' claims 1-73, a multi-step process conducted in a microchannel reactor wherein a first reaction is conducted in a first reaction zone in the microchannel reactor to form an intermediate product composition, another reaction is conducted in another reaction zone in the microchannel reactor to form a final product, and the first reaction zone and the second reaction zone are separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled. The teachings in O'Rear et al. are also not relevant with respect to the Applicants' claim 74 since claim 74 is directed to a process for making dimethyl ether.

The examiner cited Van Egmond for its disclosure of methanol synthesis at a temperature in the range of 150-450°C. The teachings in Van Egmond are clearly distinguishable from the requirements of Applicants' claims 1-74. Van Egmond et al. discloses a process wherein a methanol synthesis system is integrated with a methanol to olefin reaction system which is clearly distinguishable from the process specified in the Applicants' claims 1-73. Van Egmond et al. does not suggest, as specified in the Applicants' claim 1-73, a multi-step process conducted in a microchannel reactor wherein a first reaction is conducted in a first reaction zone in the microchannel reactor to form an

intermediate product composition, another reaction is conducted in another reaction zone in the microchannel reactor to form a final product, and the first reaction zone and the second reaction zone are separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled. The disclosure in Van Egmond et al. is also distinguishable from claim 74 which relates to producing dimethyl ether.

Brophy et al. is cited for its teaching of "a method of methanol synthesis (col. 34) wherein a claimed pressure and contact time are employed (col. 34)." The teachings in Brophy et al. are clearly distinguishable from the process specified in the Applicants' claims 1-73. These claims specify a multi-step process conducted in a microchannel reactor wherein a first reaction is conducted in a first reaction zone in the microchannel reactor to form an intermediate product composition, another reaction is conducted in another reaction zone in the microchannel reactor to form a final product, and the first reaction zone and the second reaction zone are separated by a non-reactive zone in the microchannel reactor wherein the intermediate product composition is heated or cooled. This is not disclosed in Brophy et al. Also, Brophy et al. does not suggest the multi-step process for making dimethylether specified in claim 74.

Applicants respectfully submit that claims 1-74 are not obvious over the teachings in TeGrotenhuis et al. taken in combination with the teachings in Van Egmond, O'Rear et al. and Brophy et al. Withdrawal of the rejection of these claims is believed to be warranted and is respectfully requested.

Applicants respectfully submit that the application is in condition for allowance. A Notice of Allowance is respectfully requested. In the event the Examiner would like to discuss any matters concerning this application, he is invited to contact the undersigned

attorney by telephone. Any fees required for the filing of this paper may be charged to Deposit Account Number 18-0988.

Respectfully submitted,

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